What is claimed is:

1. A method for optically inspecting a sample, the method comprising:

illuminating the sample with an incident field;

measuring the resulting output field to determine an optical response of the sample;

generating measurement parameters that correspond to the measured optical response by performing the following operations:

a) searching a database to locate a pre-computed optical response and associated measurement parameters,

b) interpolating between pre-computed responses in the database to generate an interpolated optical response and associated measurement parameters, and

c) iteratively evaluating a theoretical model to generate a theoretical optical response and associated measurement parameters.

2. A method as recited in claim 1 that further comprises the step of iteratively evaluating the theoretical model to generate the database.

3. A method as recited in claim 1 wherein the step of interpolating is performed without evaluating the theoretical model.

4. A method as recited in claim 1 wherein the database searching, database interpolation and model evaluation operations are performed in sequence to successively refine an optical response and associated measurement parameters.

5. A method as recited in claim 1 wherein the database interpolation is performed using reduced multicubic interpolation.

6. A method as recited in claim 1 wherein the operations a, b and c are performed in order.

7. A device for optically inspecting a sample, the device comprising:

a measurement system for illuminating the sample with an incident field and measuring the resulting output field to determine an optical response of the sample;

a processor for generating measurement parameters that correspond to the measured optical response, the processor configured to include:

a database searching module for searching a database to locate a pre-computed optical response and associated measurement parameters

a interpolated refinement module for interpolating between pre-computed responses in the database to generate an interpolated optical response and associated measurement parameters; and

a theoretical refinement module for iteratively evaluating a theoretical model to generate a theoretical optical response and associated measurement parameters.

8. A device as recited in claim 7 wherein the database is generated by iteratively evaluating the theoretical model.

9. A device as recited in claim 7 wherein the interpolated refinement module operates without evaluating the theoretical model.

10. A device as recited in claim 7 wherein the database searching, database interpolation and model evaluation operations are invoke in sequence to successively refine an optical response and associated measurement parameters.

11. A device as recited in claim 7 wherein the database interpolation is performed using reduced multicubic interpolation.

illuminating the sample with an incident field;

measuring the resulting output field to determine a measured optical response of the sample;

searching within a database of pre-computed optical responses and associated measurement parameters to locate the pre-computed optical response that most closely matches the measured optical response;

interpolating within the database to refine the pre-computed optical response obtained from the database to more closely match the measured optical response; and

iteratively evaluating a theoretical model to refine the optical response obtained by interpolation to more closely match the measured optical response.

12. A method as recited in claim 11 that further comprises the step of iteratively evaluating the theoretical model to generate the database.

13. A method as recited in claim 11 wherein the step of interpolating is performed without evaluating the theoretical model.

14. A method as recited in claim 11 wherein the database interpolation is performed using reduced multicubic interpolation.

15. A method of evaluating a sample comprising the steps of:

creating a database of pre-computed optical responses and associated measurement parameters of the sample;

optically inspecting the sample to generate an empirical optical response;

comparing the empirical optical response to the theoretical optical responses stored in the database and selecting the closest match;

using the closest match, interpolating between pre-computed responses in the database to generate an interpolated optical response and associated measurement parameters; and

using the interpolated optical response and associated measurement parameters as a starting point, iteratively evaluating a theoretical model corresponding to the sample to minimize the difference between theoretically generated optical responses and the empirical optical response to produce a best fit for the actual measurement parameters of the sample.

16. A method as recited in claim 15 that further comprises the step of iteratively evaluating the theoretical model to generate the database.

17. A method as recited in claim 15 wherein the interpolated optical response is generated without evaluating the theoretical model.

18. A method as recited in claim 15 wherein the interpolated optical response is generated using reduced multicubic interpolation.